COMMERCIAL STANDARD CS225-59

Method of Rating Commercial and Industrial Type Vacuum Cleaners (Portable and Mobile)

A recorded voluntary standard of the trade published by the U.S. Department of Commerce

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U.S. DEPARTMENT OF COMMERCE
Frederick H. Mueller, Acting Secretary
OFFICE OF TECHNICAL SERVICES
Commodity Standards Division

With the cooperation of
National Bureau of Standards

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforcible through usual legal channels as a part of the sales contract.

Commercial Standards originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The division by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the division assures continuous servicing of each Commercial Standard through review and revision whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

The initial printing of Commercial Standard CS225-59 was made possible through the cooperation of the Floor and Vacuum Machinery Manufacturers' Association

Method of Rating Commercial and Industrial-Type Vacuum Cleaners, (Portable and Mobile)

[Effective July 1, 1959]

1. PURPOSE

1.1 The purpose of this Commercial Standard is to establish a uniform method of rating vacuum cleaning equipment of commercial and industrial types. Its purpose is also to clarify the significance of commercial ratings, and to serve as a guide to producers, distributors and users in evaluating the performance of the machines, thus promoting fair competition.

2. SCOPE

2.1 This standard applies to commercial and industrial vacuum cleaners with hose for normal operation, and provides a method for rating such equipment based on vacuum and volume of air flow as determined by tests. Provisions for rating electric motors used with the vacuum cleaners are included. Means are also given for identifying ratings that are in compliance with this standard.

3. DEFINITION

3.1 MANUFACTURER.—For the purpose of this standard the manufacturer is the company or organization which evidences its responsibility to the purchaser by affixing its name and address, or nationally registered trade mark or trade name to the vacuum cleaner.

4. REQUIREMENTS

4.1 VACUUM CLEANER RATINGS.—The ratings shall give the performance of the machines in terms of air performance and electrical performance, in accordance with pars. 4.1.1 and 4.1.2, as determined by the test specified herein.

4.1.1 *Air performance.*—Air performance of vacuum cleaners shall be given in terms of suction in inches of water, with orifices as described in 5.1, 5.1.1, and 5.2 serving to establish definite rates of air flow.

4.1.2 *Electrical Performance.*—Electrical performance of vacuum cleaners shall be given in terms of watts input and amperes at rated voltage, taken by the driving motors at definite values of vacuum and air flow as described in 4.1.1.

4.2 SERIES WOUND MOTOR RATINGS.—Nameplate ratings of series wound motors on vacuum cleaners shall be in accordance with Underwriters' Laboratories requirements, given in terms of voltage and frequency rating and in terms of amperes taken by the motor at a wattage electrically midway between the sealed and fully open points (mini-

mum and maximum loads). If motor horsepower is also given, it shall be designated as continuous shaft output under the maximum load on the vacuum cleaner at rated speed and voltage. When operated under rated conditions the temperature rise of the motors shall not exceed NEMA and Underwriters' Laboratories standards, as applicable. (See note.)

4.3 CONSTANT SPEED MOTOR RATINGS.—Nameplate ratings of constant speed motors on vacuum cleaners shall be given in terms of the voltage and frequency rating with speed and horsepower shown in accordance with NEMA standards as defined in the National Electrical Manufacturers' Association Motor and Generator Publication No. 45–102, latest revision. (See note.)

5. METHOD OF TEST

5.1 EQUIPMENT FOR TESTING.—A vacuum chamber 4″ in diameter by 12″ long, made in accordance with Fig. 1, shall be attached to the outer end of the suction hose (See paragraph 5.2). The opposite end of the vacuum chamber shall be equipped with means for inserting and holding orifice plates of the type and size specified below. A "U" tube water manometer with bore at least ¼″ shall be connected to the side of the vacuum chamber at approximately its mid point, as shown in Fig. 1. The opening into the chamber shall be flush with the inner surface of the chamber. All connections shall be air tight.

5.1.1 *Orifice plates.*—Orifice plates, as shown in Fig. 1, other than the closed plate, shall have sharp-edged orifices of the following diameters. Each orifice shall be a cylindrical hole at right angles to the surfaces of the plate, cut so that the edges are sharp and square. Orifices shall not vary from the specified diameter by more than plus or minus 0.1 percent for orifices over ½″ in diameter, nor by more than plus or minus 0.0005″ for orifices ½″ in diameter and smaller.

2″	1¼″	⅞″	½″	⅛″
1¾″	1⅛″	¾″	⅜″	Sealed plate
1½″	1″	⅝″	¼″	(no orifice)

5.1.2 *Measuring instruments.*—A suitable ammeter, voltmeter, and wattmeter accurate to within plus or minus ¾ percent of the full scale reading, shall be provided. Speed shall be determined by a suitable tachometer that is accurate within plus or minus 2 percent of full scale reading. No reading below 30 percent of full scale reading shall be recorded.

5.2 METHOD OF TESTING.—The vacuum cleaner to be tested shall be equipped with a new clean filter bag and be placed on a firm, level support. The suction hose with attached vacuum chamber shall be laid out straight so as to be approximately in line with the intake connection of the vacuum cleaner. Hose shall be of the length and diameter regularly supplied for general use in cleaning, as stated by the manufacturer, and shall also be of the same type as that regularly supplied.

5.2.1 *Voltage.*—The voltage, phase and frequency at the motor connections during the test shall be as specified on the motor nameplate. Universal motors rated 25 to 60 cycles shall be tested on 60 cycles.

NOTE.–National Electrical Manufacturers' Association (NEMA) standards are published by the National Electrical Manufacturers' Association, 155 E. 44th Street, New York 17, N.Y. Underwriters' Laboratories standards are published by the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago 11, Illinois.

5.2.2 *Temperature and barometric conditions.*—The tests shall be conducted in an ambient temperature of 65° to 90° F. and with the barometric pressure between 29.0 and 30.0 inches of mercury.

5.2.3 *Conduct of tests.*—The vacuum cleaner shall be run with orifices of different sizes in the test equipment, as described in 5.1 and 5.1.1. Uniform running conditions shall be established by a suitable warm-up period of operation. For each run with a different orifice, the vertical distance between the water levels in the two columns of the manometer shall be measured to the nearest 0.10 inch, and the watts input, voltage, amperes, and speed shall also be measured. Tests shall not be run when specified conditions of voltage, temperature and barometric pressure are subject to sudden variations beyond the specified limits. Runs shall be made with a sufficient number of different orifice plates to provide the desired data on the performance of the equipment.

5.2.4 *Performance data.*—The performance data determined by the tests shall be clearly and accurately reported either in tabular or graphic form. The voltage at which the tests were run shall be given with each table or graph. Performance data obtained by extrapolation of actual test data shall not be given.

6. MARKING

6.1 Manufacturer's Name and Trade Mark.—The manufacturer's name or his nationally registered trade mark, or trade name, shall be clearly, legibly and permanently marked in a readily accessible location on the vacuum cleaner.

6.2 Motor Ratings.—The ratings of the motor, as specified in 4.2 or 4.3, whichever applies, shall be clearly, legibly, and permanently marked in a readily accessible location on the machine.

6.3 Compliance.—In order that purchasers of vacuum cleaners may be assured of obtaining equipment rated in accordance with this standard, the manufacturer may declare that the ratings given are in compliance with it. The following compliance statement is recommended for inclusion with sales literature, invoices and contracts, in conjunction with the manufacturer's name and address:

> The ratings given for this vacuum cleaner were determined in accordance with Commercial Standard CS225–59, as developed by the trade under the procedure of the Commodity Standards Division and issued by the U.S. Department of Commerce.

7. REFERENCES

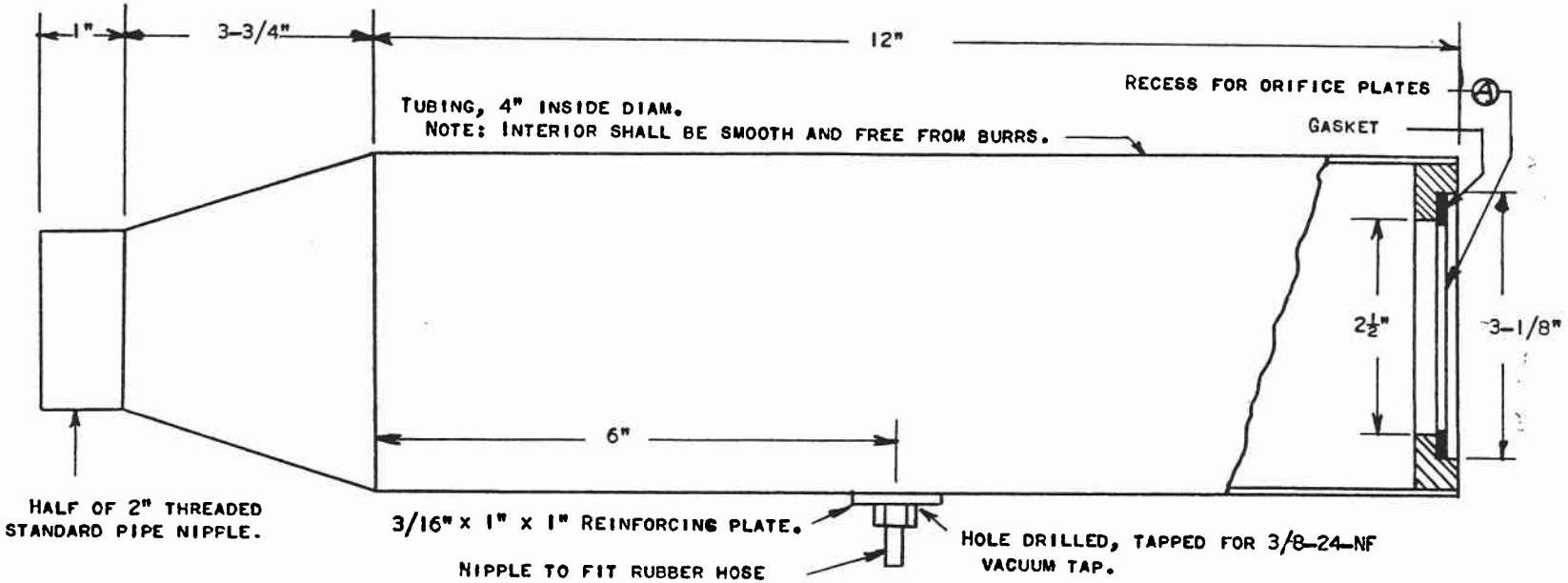
The following technical references may be consulted if additional information on orifice characteristics is desired:

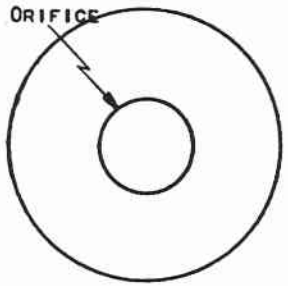
1. Marks' Mechanical Engineers' Handbook. McGraw-Hill Book Co., New York, New York, 1951 edition.
2. Measurement of Air Flow. E. Ower. Chapman-Hall, 11 Henrietta St., London W.C.2, England.
3. Fan Engineering. Handbook published by the Buffalo Forge Co., Buffalo, New York.

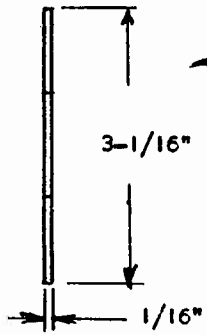
8. EFFECTIVE DATE

Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors hereinafter listed, this Commercial Standard was issued by the United States Department of Commerce, effective from July 1, 1959.

Edwin W. Ely,
Chief, Commodity Standards Division.







Ⓐ ORIFICE PLATES WITH SHARP EDGE ORIFICES OF THE FOLLOWING DIAMETERS, AND WITHOUT ORIFICE, - 14 REQUIRED:

2"	1 1/4"	7/8"	1/2"	1/8"
1 3/4"	1 1/8"	3/4"	3/8"	
1 1/2"	1"	5/8"	1/4"	NO ORIFICE

FIG. 1. TESTING CHAMBER FOR VACUUM CLEANERS.

9. HISTORY OF PROJECT

In response to a desire for more useful commercial ratings for its members' products, the Floor and Vacuum Machinery Manufacturers Association, through its Vacuum Affairs Committee, adopted in 1955 a method of rating commercial and industrial type vacuum cleaners. On October 14, 1955, the Association requested the assistance of the Commodity Standards Division in establishing a Commercial Standard for the method so as to secure its general recognition and use throughout the industry.

A description of the method was given in a Proposed Commercial Standard which, upon approval by the Association, was circulated on October 5, 1956, to manufacturers and others for review. The comments and suggestions received were carefully considered, and a revised proposal conforming to the consensus of views given by the industry was submitted by the Association on April 10, 1958, to the Commodity Standards Division. It was embodied into a Recommended Commercial Standard for Method of Rating Commercial and Industrial Type Vacuum Cleaners, Portable and Mobile Types, TS–5416, and on September 24, 1958, copies were circulated to manufacturers, distributors and users of the equipment for acceptance.

The response gave satisfactory evidence of general industry support and represented a substantial majority of production, by volume, of the products covered. Accordingly, the Commercial Standard was established as CS225–59, and announced to the industry on May 28, 1959.

Project Manager: A. S. Best, Commodity Standards Division, Office of Technical Services.

Technical Advisers: Samuel H. Womack, Mechanical Instruments Section and Dr. F. M. Defandorf, Chief, Electrical Instruments Section, National Bureau of Standards.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Technical Services, United States Department of Commerce which acts as secretary for the committee.

R. A. Brackett, The Spencer Turbine Co., 486 New Park Avenue, Hartford 6, Conn., Chairman.

Dewey I. Doyle, Doyle Vacuum Cleaner Co., 225 Stevens St., S.W., Grand Rapids 2, Mich.

Adam A. Breuer, Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago 40, Ill.

I. J. Fuchs, United States Testing Co., Inc., 1415 Park Ave., Hoboken, N.J.

Sam Tour, American Standards Testing Bureau, Inc., 44 Trinity Place, New York 6, N.Y.

J. Stanley Bien, Purchasing Division, Michigan State Department of Administration, Lewis Cass Bldg., Lansing 13, Mich.

ACCEPTANCE OF COMMERCIAL STANDARD

CS225–59, Method Of Rating Commercial And Industrial-Type Vacuum Cleaners (Portable And Mobile)

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date _____

Commodity Standards Division
Office of Technical Services
U.S. Department of Commerce
Washington 25, D.C.

Gentlemen:

We believe that this Commercial Standard constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production [1] distribution [1] purchase [1] testing [1]

of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer _____
(In ink)

(Cut on this line)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City, zone, and State _____

[1] Underscore the applicable words. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interest, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard, where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function, performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a nationwide basis is fourfold: First, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations listed below have individually accepted this standard for use as far as practicable in the production, distribution, purchase, or testing commercial and industrial-type vacuum cleaners. In accepting the standard, they reserve the right to depart from it as they individually deem advisable. It is expected that products which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS

(General Support)

American Hospital Association, Chicago, Ill.
American Motor Hotel Association, Kansas City, Mo.

FIRMS AND OTHER INTERESTS

American Research & Testing Laboratories, Chicago, Ill.
American Standards Testing Bureau, Inc., New York, N.Y.
Black & Decker Manufacturing Co., Towson, Md.
Blanchard, G. W. Co., Inc., Washington, D.C.
Boeing Airplane Co., Plant Service Section, Seattle, Wash.
Boss Hotels Co., Des Moines, Iowa
Bowser-Morner Testing Laboratories, Inc., Dayton, Ohio
Breuer Electric Manufacturing Co., Chicago, Ill.
California Testing Laboratories, Inc., Los Angeles, Calif.
Certified Chemical & Equipment Co., Cleveland, Ohio
Clarke Floor Machine Co., Muskegon, Mich.
Colburn Laboratories, Inc., Chicago, Ill.
Crippen & Erlich Laboratories, Inc., Baltimore, Md.
Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Eureka Williams Corp., Bloomington, Ill.
Finnell System, Inc., Elkhart, Ind.
Froehling & Robertson, Inc., Richmond, Va.
Hunt, Robert W., Co., Chicago, Ill.
Ideal Industries, Inc., Sycamore, Ill.
Invincible Vacuum Cleaner Manufacturing Co., Dover, Ohio
Kansas, State of, Department of Administration, Topeka, Kans.
Kent Co., Inc., Rome, N.Y.
Lamb Electric Co., Division of American Machine & Metals, Inc., Kent, Ohio
Lamson Corp., Blower Division, Syracuse, N.Y.
Michigan, State of, Department of Administration, Lansing, Mich.
Multi-Clean Products Inc., St. Paul, Minn.
New York Testing Laboratories, Inc., New York, N.Y.
Northrop Aircraft, Inc., El Segundo, Calif.
Patzig Testing Laboratories, Des Moines, Iowa
Sears, Roebuck & Co., Chicago, Ill.
Sherman Car Wash Equipment Co., Palmyra, N.J.
Spencer Turbine Co., Hartford, Conn.
Spiegel, Inc., Chicago, Ill.
Strapavac Corp., Brooklyn, N. Y.
United Floor Machine Co., Chicago, Ill.
United States Testing Co., Inc., Hoboken, N.J.
Yellowstone Park Co., Yellowstone Park, Wyo.

OTHER COMMERCIAL STANDARDS

A list of Commercial Standards may be obtained from the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. This list includes the purchase price of each publication and gives directions for ordering copies.

U.S. GOVERNMENT PRINTING OFFICE: 1959

DEPARTMENT OF COMMERCE

National Bureau of Standards

VOLUNTARY PRODUCT STANDARDS

Notice of Action on Proposed Withdrawal

In accordance with the provisions of § 10.12 of the Department's published "Procedures for the Development of Voluntary Product Standards" (15 CFR Part 10, as amended; 35 F.R. 8349 dated May 28, 1970), notice is hereby given of the withdrawal of 66 standards identified below. Each of these standards, Commercial Standard (CS) and Simplified Practice Recomendation (SPR), has been found to be obsolete, no longer technically adequate, no longer acceptable to and used by the industry, or otherwise not in the public interest.

CS	16–29	Wallpaper.
CS	26–30	Aromatic Red Cedar Closet Lining.
CS	27–36	Mirrors.
CS	28–46	Cotton Fabric Tents, Tarpaulins, and Covers.
CS	43–32	Grading of Sulphonated (Sulphated) Oils Saponifiable Types.
CS	61–51	Venetian Blinds (Grade A Custom-Made).
CS	73–61	Old Growth Douglas Fir, Sitka Spruce, and Western Hemlock Doors.
CS	76–39	Hardwood Interior Trim and Molding.
CS	78–40	Ground-and-Polished Lenses for Sun Glasses.
CS	79–40	Blown, Drawn, and Dropped Lenses for Sun Glasses.
CS	80–40	Hardwood Stair Treads and Risers.
CS	92–41	Cedar, Cypress and Redwood Tank Stock Lumber.
CS	119–45	Dial Indicators (For Linear Measurements).
CS	133–46	Woven Wire Netting.
CS	140–47	Testing and Rating Convectors.
CS	141–47	Sine Bars, Blocks, Plates and Fixtures.
CS	159–49	Sun Glass Lenses Made of Ground and Polished Plate Glass Thereafter Thermally Curved.
CS	160–49	Wood Fiber Blanket Insulation (For Building Construction.)
CS	161–59	"Standard Grade" Hot Dipped Galvanized Ware (Coated After Fabrication).
CS	162–49	Tufted Bedspreads.
CS	167–50	Automotive and General Service Copper Tube.
CS	168–50	Polystyrene Plastic Wall Tiles, and Adhesives for Their Application.
CS	169–59	Galvanized Ware Fabricated from Pregalvanized Steel Sheets (For Standard Grade Items Only).
CS	206–57	Solvent Welded (SWP Size) Cellulose-Acetate Butyrate Pipe.
CS	225–59	Method of Rating Commercial and Industrial Type Vacuum Cleaners, Portable and Mobile Types.
CS	232–60	Industrial Wire Cloth.
CS	244–62	Roof Drainage Products.
CS	252–63	TFE-Fluorocarbon (Polytetrafluoroethylene) Resin Electrical Insulating Tubing.
CS	263–64	Aluminum Nails.
CS	267–65	Steel Medicine Cabinets.
SPR	11–36	Bed Blanket Sizes.
SPR	22–40	Paper (Basic Sheet Sizes).
SPR	31–63	Loaded Shot Shell.
SPR	37–38	Commercial Forms (Invoice, Purchase Order and Inquiry).
SPR	42–61	Grocers' Paper Bags.
SPR	47–54	Cut Tacks and Small Cut Nails.
SPR	51–29	Chasers for Self-Opening and Adjustable Die Heads.
SPR	53–63	Steel Spirals for Reinforced Concrete Columns.
SPR	62–63	Metallic Cartridges.
SPR	76–40	Ash Handles.
SPR	81–28	Binders' Board.
SPR	90–62	Hack-Saw Blades.
SPR	91–32	Glass Containers for Preserves, Jellies and Apple Butter.
SPR	129–59	Merchandise Paper Bags.
SPR	146–52	Corrugated and Solid-Fiber Boxes for Canned Fruits and Vegetables.
SPR	150–34	Copper Wire Nails.
SPR	155–49	Cans for Fruits and Vegetables (Names, Dimensions, Capacities and Designated Use).
SPR	162–35	Packaging of Air Brake (Electric Railway) Parts.
SPR	173–54	Stock Folding Boxes for Millinery.
SPR	197–51	Glass Containers for Maraschino Cherries.
SPR	206–55	Fluid-Milk Cans.
SPR	213–45	Asphalt Roll Roofing and Asphalt and Tar-Saturated Felt Products.
SPR	217–49	Copper Water Tube, and Copper and Brass Pipe.
SPR	218–46	Paper Tubes for Packaging Milk Bottle Caps.
SPR	223–47	Wire Nails and Staples.
SPR	228–47	Pallets for Handling Groceries and Packaged Merchandise.
SPR	235–48	Copper and Copper-Alloy Round Seamless Tube.
SPR	241–50	Copper and Copper-Alloy Rod.
SPR	246–51	Wooden Kegs for Nails.
SPR	248–52	Packaging of Standard Malleable Iron Screwed Pipe Fittings, Black or Galvanized.
SPR	250–53	Standard Drug Catalogs.
SPR	251–54	Packaging of Gas Stop Cocks.
SPR	254–54	Packaging of Steel Pipe Couplings.
SPR	256–55	Steel Outlet Boxes, Zinc or Cadmium Coated.
SPR	262–60	Acoustical Materials.
SPR	263–60	Standard Shapes, Sizes, Grades and Designations of Cemented Carbide Products.

Public notice of the Department's intention to withdraw these standards was published in the FEDERAL REGISTER on March 3, 1972 (37 F.R. 4459), and a 45-day period was provided for the submission of comments or objections concerning the proposed withdrawal of any of these standards. No objections to the Department's intention of withdrawing any of these standards have been received by the National Bureau of Standards.

The effective date for the withdrawal of these standards will be 60 days after the publication of this notice. This withdrawal action terminates the authority to refer to these standards as Voluntary Product Standards developed under the Department of Commerce Procedures.

Dated: April 27, 1972.

LEWIS M. BRANSCOMB,
Director.

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